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STREET SCENE IN CAIRO.

SKETCHES OF CAIRO.

I.

THE desire of an intellectual people to become more intimately acquainted with the various nations of the world is one of the means which Providence has appointed of diffusing the blessings of civilization. Some men feel an ardent desire to visit distant lands,—to study the manners, laws, and customs of their inhabitants,—to examine the natural phenomena and productions with reference to science or to commerce,—and such men willingly expatriate themselves in order to gratify the ruling principle of their minds. But all men feel this principle in a greater or less degree, and the sketches of the artist and of the traveller are received with that respect and attention which show how deeply interested we are in the condition of our fellow-creatures in every part of the habitable globe. Such are the feelings of a people advancing in knowledge. How different is the view of this subject taken by a nation which for many centuries has occupied only a stationary position! the Arab looks with astonishment at the labours of the antiquary among the ancient monuments on the banks of the Nile, and is satisfied that he would not undergo such toil were he not seeking for hidden gold; even the more polished Egyptian regards the traveller either as a spy or as an emissary from his king, and it is difficult to convince him that this is not the case, so strange is the idea of a man's incurring great trouble and expense, for the purpose of acquiring the knowledge of foreign lands.

We feel, however, that the motives of the traveller are pure and disinterested,—his object being either to confer benefits on the people among whom he travels, or to contribute to the advancement of science among ourselves. At no distant period the details of the traveller were received with suspicion, even among ourselves,—his object was supposed to be to astonish and mislead,—and, referring everything to the standard of our own manners and customs, we received with contemptuous incredulity whatever differed greatly from it. This littleness of feeling has gradually given way under the exertions of first-rate men, who have visited and revisited distant climes, and have authenticated and enlarged the accounts already received. The artist and the traveller unite in conveying to us ideas so clear and precise of the different regions of the globe that we may well be content to remain at home, and yet become minutely acquainted with whatever region we desire to be informed of.

Egypt has ever been a land to which the traveller's curiosity has been directed; but while the antiquities, the manners, and customs of its ancient inhabitants have excited so much attention, it has been regretted that the modern tenants of this wonderful land should have been so imperfectly noticed. Through the exertions chiefly of two individuals this cause of regret no longer exists. Since Mr. Lane has published his *Account of the Manners and Customs of the Modern Egyptians*, and Mr. Robert Hay his *Illustrations of Cairo*, we are in possession of details so full, accurate, and minute that, although it would be too much to say that nothing more is left to be desired, yet it is probable that no other people have received a greater share of attention from the artist and the traveller. Mr. Lane resided among them for several years,—adopted their language, dress, manners and national peculiarities. Mr. Hay has furnished a noble volume* of lithographic prints, in the most exquisite style of art, from drawings made on the spot, accompanied with letter-press descriptions; and from these two sources, as also from the small but accurate

work of Mr. Kinnear, who visited Egypt in 1839, we propose to furnish a few sketches of Cairo, first offering our best thanks to Mr. Hay for the kind liberality with which he has allowed us to copy his drawings.

GRAND CAIRO, the modern Egyptian metropolis, now called MUSR, was founded by Jawhar, a Moggrebin general, in the middle of the tenth century. He gave his new city the name of AL-KAHIRA, or EL-CKAHIREH, (that is, The Victorious,) whence Europeans have formed the name of Cairo. It is situated at the entrance of the valley of Upper Egypt, midway between the Nile and the eastern mountain-range of Mookkuttum. Between it and the river is a tract of land, mostly cultivated, which in the northern parts (where the port of Boolack is situated) is more than a mile wide, and at the southern part less than half a mile. The city occupies a space equal to about three square miles, and is divided into the new and old cities. The old city is on the eastern bank of the Nile, and now almost uninhabited. The new city, which is properly Cairo, is seated in a sandy plain, about two miles and a half from the old city, and on the same side of the river. It is extended along the mountain, near a point of which, at an angle of the town, a castle is built, the city having been removed hither, it is supposed, in order to be under its protection. The city is surrounded by a wall, and the gates are shut at night.

The streets of Cairo are in general narrow and intricate, especially in the Jews' quarter, where some of the passages barely admit of two persons passing each other. The windows, with curiously carved wooden lattices, project so much on either side as nearly to meet over-head, and exclude much of the light, and, although this produces a useful and agreeable shade from the sun, it gives a sombre and dismal appearance to those streets which contain only dwelling-houses. In these streets very few passengers are seen, but in the bazaars and great thoroughfares there is a continual stream of Turks, Copts, Jews, Dervishes, and Bedaweens from the Desert, in their picturesque and graceful costumes.

A stranger who merely passed through the streets would regard Cairo as a very close and crowded city, but that it is not so is evident to a person who overlooks the town from the top of a lofty house, or from the minaret of a mosque, from whence may be observed within the walls many vacant places, some of which, during the season of inundation, are lakes. The gardens, burial-grounds, the courts of houses, and the mosques also occupy a considerable area. The great thoroughfares have generally a row of shops along each side. Above the shops are apartments, which do not communicate with them, and which are seldom occupied by the persons who rent the shops. To the right and left of the great thoroughfares are by-streets and quarters. Most of the by-streets have a large wooden gate at each end, closed at night, and kept by a porter within, who opens to any persons requiring to be admitted. The quarters mostly consist of several narrow lanes, having but one general entrance, with a gate, which is also closed at night, but several have a by-street passing through them.

In a country where neither births nor deaths are registered, it is difficult to ascertain with any precision the amount of population. A few years ago a calculation was made founded on the number of houses in Egypt, and the supposition that the inhabitants of each house in the metropolis amount to eight persons, and in the provinces to four. Mr. Lane thinks this computation approximates very nearly to the truth; and, according to it, Cairo contained previous to the plague of 1835 about 240,000 inhabitants. That calamity removed not less than one-third of the amount; but the deficiency was rapidly supplied from the villages. Of the inhabitants of the metropolis, about 190,000 are Egyptian Moslems; about 10,000 are Copts, or Christian Egyptians;

* *Illustrations of Cairo*, by ROBERT HAY, Esq., of Linplum. Drawn on stone by J. C. BOURNE, under the superintendence of OWEN B. CARTER, Architect. This work is appropriately dedicated to Edward William Lane, Esq., "as a tribute of respect for the zeal and fidelity he has evinced in his literary pursuits connected with that country."

between 3000 and 4000 are Jews; and the remainder are strangers from various parts of the world.

We will speak more particularly of the Mooslims in a future article. The Copts are most probably the descendants of the ancient Egyptians, and differ from the Mooslims in religion; a difference sufficient in a land of religious intolerance to sever every other tie between them. It is difficult for a stranger to perceive any difference between the Coptish countenance and that of the Mooslim, beyond a certain downcast and sullen expression of countenance which generally marks the former. The Copt is distinguished by a black or dark blue turban; or one of a grave drab colour; and the Mooslims themselves often fail to recognize a Copt when they see him in a white turban. The Coptish patriarch, although styled patriarch of Alexandria, has his residence in Cairo, and is said to be very wealthy. He is chosen by lot from among the monks of the convent of St. Anthony. With the exception of a few who adhere to the Greek Church, they are of the sect called Jacobites or Eutychians, from Jacobus Baradaeus, the propagator of the Eutychian doctrines.

One of the most remarkable traits in the character of the Copts is their bigotry. They bear a bitter hatred to all other Christians; even exceeding that with which the Mooslims regard the unbelievers in el-Islam. Yet they are considered, by the Mooslims, as much more inclined than any other Christian sect to the Mohammedan faith; and this opinion has not been formed without reason; for vast numbers of them have, from time to time, and not always in consequence of persecution, become proselytes to this religion. They are, generally speaking, of a sullen temper, extremely avaricious, and abominable dissemblers; cringing or domineering according to circumstances.

The Copts are not now despised and degraded by the government as they were a few years ago. Some of them have even been raised to the rank of beys. Before the accession of Mohammed Allee, neither the Copts nor other Eastern Christians, nor Jews, were generally allowed to ride horses in Egypt; but this restriction has, of late years, been withdrawn. A short time since, the Mooslims of Damascus, who are notorious for their bigotry and intolerance, complained to the conqueror, Ibraheem Basha, of the Christians in their city being allowed to ride horses; urging, that the Mooslims no longer had the privilege of distinguishing themselves from the infidels. The Basha replied, "Let the Mooslims still be exalted above the Christians, if they wish it: let them ride dromedaries in the streets: depend upon it the Christians will not follow their example." The Copts enjoy an immunity for which they are much envied by most of the Mooslims: they are not liable to be taken for military service; as no Mohammedan prince would honour a Christian by employing him to fight against a Mooslim enemy.

The Coptic is now a dead language, and is only preserved in the religious books; the Arabic being spoken by the Copts as by the Mooslims, and taught in their schools.

The Jews inhabit the worst quarter of Cairo, a labyrinth of dark narrow lanes, in which it is hardly possible for two persons to pass. In their dress and persons they are generally slovenly and dirty. Many of them have sore eyes and a bloated complexion, occasioned, it is said, by the grossness of their food, in which they use great quantities of oil of sesame. They lead a very quiet life: indeed, they find few but persons of their own sect who will associate with them; for they are held in the utmost contempt and abhorrence by the Mooslims in general, and are said to bear a more inveterate hatred than any other people to the Mooslims and the Mohammedan religion. The more wealthy Jews dress handsomely at home; but put on plain or even shabby clothes before they go out: and, although their houses have a mean and dirty appearance from the outside, many of them contain handsome and well furnished rooms. The condition of the lower orders is very wretched; many of them having no other means of support than the alms of their superiors of the same sect.

The protection afforded by Mohammed Allee to the Copts and Jews, is one great cause of the unfavourable feeling with which the rigid Mooslims regard the present government. The Christian reader will be delighted to hear that a Protestant mission is established in Cairo, and that the service of the Church of England is performed publicly every Sunday. The boys from the missionary school attend the public service in the chapel; and, it is said, that several of them are children of Mooslim parents, who are induced to send them to the school that they may acquire the English language, which is becoming an important accomplishment. "Indeed, there can be little doubt," says Mr. Kinnear, "that the toleration of the pacha's government has had a considerable effect in relaxing the bigotry of the mass of the population, and is undermining the foundations of Mohammedanism."

In our frontispiece is represented one of the sebeels, or public reservoirs for the gratuitous supply of water, which the burning climate of Egypt has rendered necessary, and the charity and munificence of the wealthy have supplied. There are about three hundred in the city, and these are annually filled at the time of the inundation.

The Emeer 'Abd er-Rahmán Kyáhhyá, a person of great wealth and power, who died in 1199, A.H.* (1766, A.D.), erected this and several other sebeels and charitable buildings. It exhibits a fantastic combination of Turkish and Arabian tastes, but is more unassuming and chaste than many of the sebeels built within the last seventy years; and the window through which the thirsty passenger receives his draught, is ornamented with a handsome bronze grating. Upon the upper part of the building is an open kuttab or school, which generally accompanies the sebeels, and it is situated at the point where two streets branch off.

In the foreground, seated in the public street, before the shop of an 'Attar or druggist, upon the floor of which is seen a nargeeleh for smoking, is represented a servant in the act of pounding some substance in a wooden mortar. A female of the lower order is advancing, veiled by the dark boorko; and another, a mendicant, is asking alms with her face uncovered,—a common circumstance amongst that class.

Beyn el-Kasreyn, that is, the Street between the two Palaces, was, a few years ago, an interesting spot for the antiquarian, from the fact of some remains existing of those buildings.

* The Mohammedans reckon from the "Hegira" or Flight of their Prophet.

MAN, indeed, may be called a bee, in a figurative style. In search of sweets, he roams in various regions, and ransacks every inviting flower. Whatever displays a beautiful appearance, solicits his notice, and conciliates his favour, if not his affection. He is often deceived by the vivid colour and attractive form, which, instead of supplying honey, produce the rankest poison; but he perseveres in his researches, and if he is often disappointed, he is also often successful. The misfortune is, that when he has found honey, he enters upon the feast with an appetite so voracious, that he usually destroys his own delight by excess and satiety.—Knox.

Among all the graces that adorn a Christian soul, like so many jewels of various colours and lustres, against the day of her espousals to the Lamb of God, there is not one more brilliant than patience.—BISHOP HORNE.

In the least,
As well as in the greatest of his works,
Is ever manifest a present God:
As well in swarms of glittering insects, seen
Quick to and fro, within a foot of air,
Dancing a merry hour, then seen no more,
As in the systems of resplendent worlds,
Through time revolving in unbounded space.

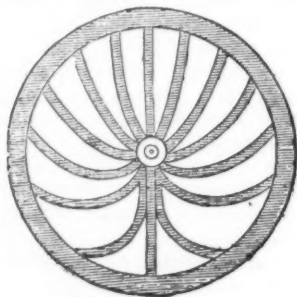
CARLOS WILCOX,
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OPTICAL ILLUSIONS. IV.

WE resume our notice of some curious optical phenomena, in which objects appear to the eye under circumstances singularly deceptive. We gave several instances of this kind in the former papers, and shall now add to the number.

Dr. Roget, in a paper communicated to the Royal Society, a few years ago, described a curious optical deception which takes place when a carriage-wheel, rolling along the ground, is viewed through the intervals of a series of vertical bars, such as those of a palisade, or of a Venetian window-blind. Under such circumstances, the spokes of the wheel, instead of appearing straight, as they would naturally do if no bars intervened, seem to have a considerable degree of curvature. The distinctness of this appearance is influenced by several circumstances; but when everything concurs to favour it, Dr. Roget states the illusion as being irresistible, and, from the difficulty of detecting its real cause, exceedingly striking.

The degree of curvature in each spoke varies, according to the situation it occupies for the moment with respect to a perpendicular line. The two spokes which arrive at a vertical position, above and below the axle, are seen of their natural shape, that is, without any curvature. Those on each side of the upper one appear slightly curved; those more remote, still more so; and the curvature of the spokes increases as the eye follows them downwards on each side, till we arrive at the lowest spoke, which, like the first, again appears straight. The most remarkable circumstance relating to this visual deception is, that the convexity of these curved images of the spokes is always turned downwards, on both sides of the wheel; and that this direction of their curvature is precisely the same whether the wheel be moving to the right or to the left of the spectator. The annexed cut will illustrate the appearance here alluded to.



Dr. Roget then instituted a series of experiments, for the purpose of arriving at results which might furnish a probable cause for the phenomenon; and he places his results under six different heads.

1. A certain degree of the velocity in the wheel is necessary to produce the deception above described. If this velocity be gradually communicated, the appearance of curvature is first perceptible in the spokes which have a horizontal position; and as soon as this is observed, a small increase given to the velocity of the wheel, produces suddenly the appearance of curvature in all the lateral spokes. The degree of curvature remains precisely as at first, whatever greater velocity be given to the wheel, provided it be not so great as to prevent the eye from following the spokes distinctly as they revolve; for it is evident that the rapidity of revolution may be such as to render the spokes invisible. It is also to be noticed that, however rapidly the wheel revolves, each individual spoke appears, during the moment it is viewed, to be at rest.

2. The number of spokes in the wheel makes no difference in the degree of curvature they exhibit.

3. The appearance of curvature is more perfectly seen when the intervals between the bars, through which the

wheel is viewed, are narrow; provided they are sufficiently wide to allow of the distinct view of all the parts of the wheel in succession, as it passes along. For the same reason the phenomenon is seen to the greatest advantage when the bars are of a dark colour, or shaded, and when a strong light is thrown upon the wheel. The deception is, in like manner, aided by every circumstance which tends to abstract the attention from the bars, and to fix it upon the wheel.

4. If the numbers of bars be increased in the same given space, no other difference will result than a greater multiplication of the curved images of the spokes; but if a certain relation be preserved between the angles subtended at the eye by the whole intervals of the bars, and of the extremities of the spokes, this multiplication of images may be corrected. The distance of the wheel from the bars is of no consequence, unless the latter are very near the eye, as in that case the apertures between them may allow too large a portion of the wheel to be seen at once.

5. If the bars, instead of being vertical, are inclined to the horizon, the same general appearances result; but with this difference, that the spokes occupying positions parallel to the bars, are those which have no apparent curvature; while the curvatures of the other spokes bear the same relation to these straight spokes, and to each other, that they did in the former case. When the inclination of the bars is considerable, the images become more crowded, and the distinctness of the appearance is thereby diminished. The deception totally ceases when the wheel is viewed through bars that are parallel to the line of its motion.

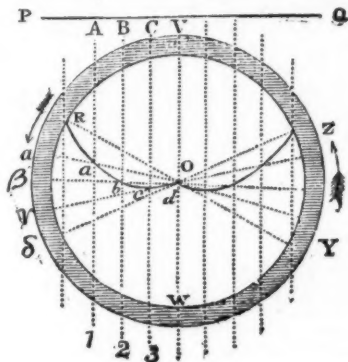
6. It is essential to the production of this effect that a combination should take place of a progressive with a rotatory motion. Thus, it will not take place if, when the bars are stationary, the wheel simply revolves on its axis, without at the same time advancing; nor when it simply moves horizontally, without revolving. On the other hand, if a progressive motion be given to the bars, while the wheel revolves round a fixed axis, the spokes immediately assume a curved appearance. The same effect will also result if the revolving wheel be viewed through fixed bars by a spectator, who is himself moving either to the right or left; because such a movement on the part of the spectator produces in his field of vision an alteration in the relative situation of the bars and wheel.

Having, in the true spirit of an experimentalist, thus investigated the consequences that would follow certain changes in the arrangement of the moving object, with a view to determine the relative importance of each, Dr. Roget proceeds to explain the principle on which the phenomenon rests. In his mode of so doing, we see the advantage of thus searching the experiment through various forms and stages; for a writer, in a scientific journal three or four years before, while describing a similar phenomenon, stated that the curvature of the spokes is produced just the same, whether a wheel be running along a plane as it revolves, as in the case of a carriage driven through the street, and viewed through the ordinary iron railing, or whether, as in a fly-wheel seen through a similar railing, it merely revolves in its own axis. Dr. Roget, however, shows both from theory and experiment, that there must be a combination of a progressive with a rotatory motion. It matters not, for the production of the phenomenon, whether the wheel or the system of bars progress, provided one or other does so.

Dr. Roget clearly shows, that the true principle on which this apparent curvature of the spokes depends, is the same as that to which is referable the illusion that occurs when a bright object is wheeled rapidly round in a circle, giving rise to the appearance of a line of light throughout the whole circumference; namely, that an impression made by a pencil of rays on the retina, if sufficiently

vivid, will remain for a certain time after the cause has ceased. To illustrate the production of the curves by a diagram would involve considerable intricacy of detail; but Dr. Roget justly observes, that the principle may be well shown, and with comparative simplicity, by supposing that the wheel has only one spoke or radius instead of several, that it revolves in a stationary axis without progressing, and that one single aperture, instead of a system of bars, progresses from one side to the other.

In the annexed cut, the wheel, provided with one spoke



or radius OR , in revolving is the direction of the arrows, and is supposed to be seen through a single narrow aperture or crevice, moving horizontally in a given direction PQ . To simplify the case further, we will suppose that the progressive motion of the aperture is just equal to the rotatory motion of the circumference of the wheel. Such being the circumstances of the experiment, it will not be difficult to understand, that if, at the time of the transit of the aperture, the radius should happen to occupy either of the vertical positions VO or OW , the whole of it would be seen at once through the aperture, in its natural position. But if it should happen to be in an oblique position RO , terminating at any point of the circumference, at the moment the aperture has, in its progress horizontally, also arrived at the same point R , the extremity of the radius will now first come into view, while all the remaining part of it is hidden. By continuing to trace the parts of the radius that are successively seen by the combined motions of the aperture and of the radius, we shall find that they occupy a curve $abcd$, generated by the continued intersection of these two lines. Thus, when the aperture has moved to A , the radius will be in the position OA ; when the former is at B , the latter will be OB , and so on.

If, pursuing the same mode of inquiry, we suppose, that when the aperture is just passing the centre, the radius is found in a certain position on the other side OY , and rising towards the summit, then, by tracing as before the intersections of these lines in their progress, we shall obtain a curve precisely similar to the former. Its position will be reversed; but its convexity will still be downwards. If the impressions made by these limited portions of the spoke follow one another with sufficient rapidity, they will, as in the case of the luminous circle already alluded to, leave in the eye the trace of a continuous curve line; and the spoke will appear to be curved, instead of straight.

By applying a similar train of reasoning to the phenomenon which gave rise to these investigations, Dr. Roget satisfactorily shows that the cause may be arrived at. Since the curved appearance of the lines results from the combination of a rotatory with a progressive motion of the spokes, in relation to the apertures through which they are viewed, it seems pretty evident that the same phenomenon must be produced if the bars be at rest, and both kinds of motion be united in the wheel itself; for, whether the bars move horizontally with respect to

the wheel, or the wheel with respect to the bars, the relative motion between them, and its effects to the eye placed behind the aperture, must be the same. The attention of the spectator should in both cases be wholly directed to the wheel, so that the motions in question should be referred altogether to it.

Dr. Roget investigates the mathematical nature of the curves, into which the spokes are apparently thrown; but such an investigation is unsuited for our pages.

LABYRINTHS.

THIS curious class of buildings seems to have been used in ancient times for the purposes of imprisonment and devotion. A labyrinth is an architectural, or other kind of construction, whose numerous passages and perplexing windings render the escape from it difficult and almost impossible. It was composed of, or filled with chambers and galleries, one running into the other; so that, without a clue or guide, a stranger could not pass through it. These edifices were not built for the purpose of making people lose their way: this was merely an accidental peculiarity, on account of which every confused mass of things, difficult to be disentangled, has been called a *labyrinth* or *maze*.

The construction of labyrinths in modern times has been chiefly for the purposes of amusement. With this view they are often formed with quickset hedges, as in the Sidney Gardens at Bath. The ancients had four labyrinths which were very celebrated:—one in Egypt, another in Crete, a third in Lemnos, and a fourth in Italy: these, therefore, we shall do well to notice in order.

The Egyptian labyrinth, the most celebrated of all, was situated in Central Egypt, above Lake Morris, not far from Crocodilopolis, in the country now called *Fayoom*. It was built about 650 years B.C. by twelve kings, who reigned at one time in Egypt; and it was probably intended for the place of their burial, and to commemorate the actions of their reign. The beauty and the art of the building were, according to Herodotus who saw it, almost beyond belief,—superior to the pyramids. The edifice contained twelve courts enclosed with walls, with as many doors opposite; six opening to the north, and six to the south, contiguous to one another; the same exterior wall extending round them. There were 3000 chambers; half in the upper part of the building above ground, and the other half below ground. The chambers above were seen by Herodotus, and astonished him beyond conception; but he was not permitted to see those below, where were buried the holy crocodiles, and the monarchs whose munificence had raised the edifice. The roofs and walls were encrusted with marble, and adorned with sculptured figures. The courts or halls were surrounded with stately and polished pillars of white stone; and according to some authors, the opening of the doors was artfully accompanied with a terrible noise, like peals of thunder.

The arrangement of the chambers of the Egyptian labyrinth seems to have been symbolic of the zodiac and the solar system. They excelled, in splendour and art, all human works. At present, only 150 rooms are reported to be accessible: the others are dark and choked with rubbish. The ancient labyrinth is supposed to be identical with the ruins of Casr Caroun.

In the midst of these ruins a large edifice rises up, of which there are several halls remaining, filled with trunks of columns. A portico, half demolished, encompasses it. Staircases may be distinguished, by which they mounted to different apartments; and others, by which they descended into subterraneous passages. But what particularly attracts attention, is the view of several low, narrow, and very long cells, which seem to have had no other destination, than to contain the bodies of the sacred crocodiles, brought hither from Crocodilo-

polis, or the City of Crocodiles, a town of Egypt near the Nile, above Memphis. The crocodiles were held there in the greatest veneration; and they were so tame that they came to feed from the hands of their feeders. This city was afterwards called Arsinoë. The crocodiles were embalmed before being consigned to the subterranean cells of the labyrinth.

These ruins, placed on the western side of the Nile, at a league's distance from Birket Caroun, formerly Lake Mœris, can only correspond with the labyrinth; for ancient authors assigned it this position, and point out no town on that side. Strabo, Ptolemy, and Herodotus, all agree in placing the labyrinth beyond the city of Arsinoë, on the western side, and on the banks of the Lake Mœris. This is exactly the situation where we meet with the ruins described by Savary. Modern travellers are all of them still astonished at these noble and magnificent ruins.

The labyrinth of Crete was the most celebrated and classic of these mazes. It belonged to the ancient town of Gnosus, which was situated on the north of the island of Crete, now called *Candia*, and west of the present city of Spinalonga. This building was constructed by Dædalus, an Athenian, for Minos, who was King of Crete, about fourteen centuries before the Christian era. It was built upon exactly the same plan as the Egyptian labyrinth; but it was by no means so large. We are told that, by the unanimous testimony of the Cretans, this labyrinth, with its many and varied spiral-formed windings, was designed as a prison, for the secure and close confinement of malefactors; and likewise, that Dædalus, its architect, having incurred the displeasure of Minos, was almost its first inmate.

Now there still exists a subterranean maze in the island of Candia, the ancient Crete, near the ruins of Gortyna, and somewhat to the south of Gnosus, whereabouts is now the town of Spinalonga. At about an hour's march from the plain of Gortyna is the mouth of this labyrinth or quarry, which is about seven or eight paces broad at its entrance, but so low that a man cannot pass it without stooping: on advancing a little way the passage widens, though even here it is often obstructed with large stones lying here and there, and also by the surface being extremely rough and uneven. The roof is flat, for it is cut in the rock above, and formed of beds of stone, lying horizontally one upon another; proceeding onwards through a sloping cavern, a great number of turnings and windings is met with, so irregular and intricate, that should a traveller, without a ball of thread or some other contrivance, strike into one of them out of the main path or alley, he would be in great danger of being bewildered and lost;—for few persons have been bold enough to explore all its mazes, so that visitors in general keep along the principal path, and seldom deviate either to the right or to the left; and, even in this case, to guard against all possible accidents, they take such precautions as scattering straw on the ground, or sticking up pieces of paper at every turning; for the eternal gloom and obscurity can scarcely be penetrated by the torches, with which every traveller is furnished, and whose faint light only seems to add to the awful gloom and perplexity.

On the left there are several vaults without any outlet, and the proper and direct road lies on the right of the entrance, where, after ascending by a narrow path, the traveller is compelled to creep upon his hands and knees for about a hundred paces, on account of the lowness of the roof. Having reached the end of this dwarfish defile, the ceiling suddenly rises to a considerable elevation, and the visitor finds himself upon his feet again. The vaulted galleries through which he now proceeds are seldom less than seven feet in height, and from six to ten in width, having a countless variety of avenues, opening on each side, and crossing each other in different directions. These roads are all cut with a

chisel in the rock, the layers of which are disposed in a horizontal plane, and are of a grayish colour. In some places enormous masses of stone, half torn from the roof, seem ready to fall upon the head of the adventurous passenger, while he, in danger of being crushed, must stoop low, in order to pass beneath them. Earthquakes, from which this island has often suffered, have doubtless occasioned these fractures in the rock.

The traveller has often, after advancing a considerable distance in one division, to retrace his steps, on account of no opening being in that direction. Sometimes, after long windings, he is surprised to find himself at the very place from which he had last set out. To enumerate or describe all the complication or intricacy of the circuitous avenues cut in this stupendous excavation would be almost beyond the power of language. Seeing them is the only method of obtaining an accurate knowledge, and of thoroughly appreciating these gigantic wonders. Some of these galleries form curves, leading imperceptibly to a wide space, the roof of which is supported by large pillars, and here three or four roads meet, running in opposite directions, while others extend in a spiral form for a considerable way, and in several ramifications are carried to a great length, and being then terminated by the rock, put a stop to the traveller's progress.

The distance from the mouth to the end of the cavern is more than a mile: here the walk divides itself into two or three branches, and terminates in two large halls, from twenty to thirty feet square. In passing along one of this infinite number of winding paths, a very fine grotto is discovered, the roof of which is elevated in the form of a dome, all of which appears formed by the hand of nature. It however possesses no stalactites, nor are any such crystal curiosities met with in any part of this underground wilderness, for the cavern is completely dry, and no water is seen trickling through the rock, as is usual in such places; but, as there is no vent or admission for fresh air, the consequence is that a most disagreeable smell or effluvia is constantly floating in the atmosphere of these vaulted tomb-like paths, and the thousands of bats,—the only occupants of these dark recesses,—do not conduce a little to the foul and disgusting scent with which the noses of travellers are assailed in their progress. There is a most peculiar property connected with the stone of this quarry, for it is a surprising, but yet authenticated fact, that any letters or figures inscribed or engraved on the plain surface of the rock will, in the course of time, swell above the face of the stone, and be no longer hollow, but projecting or embossed characters, and the matter produced by this filling up is always found to be whiter than the rest of the rock.

In wandering through such an horrific and sombre place as this, the imagination conjures up a host of frightful or fantastic images;—it fancies steep precipices and yawning chasms about to ensnare the feet of the curious observer,—hideous monsters ready to spring upon him at every turn,—in a word, a thousand chimeras, which have no existence except in romances and fables; and when a traveller thinks of himself as being there alone, without either thread or torch, he feels a thrilling horror come over him, a torpor seizes his mind, and his faculties seem to forsake him: his very soul is filled with terror. Every thing around convinces him, that, if placed in such an awful situation, all hope would be extinguished in his bosom, and nothing would be left but to meet death with fortitude and resignation.

Some writers imagine that the maze at Gortyna was nothing but a quarry, out of which were dug the materials for building the ancient towns of Gnosus and Gortyna; but others decidedly oppose this opinion, stating that the stone is too soft for the purposes of architecture; that the way from the cavern is almost impassable, especially for vehicles heavily laden; and that, had the way

been good, the entrance to the cavern would have been larger; and that, as it is, all stones brought from the interior must have been first broken into small pieces, which would have greatly and unnecessarily increased both the labour and the expense. We come, therefore, to the most probable conjecture,—which is, that it was, at first, an enormous cave; that nature had drawn the plan and formed the outlines; that Dædalus enlarged several of the passages, and cut out many new ones; and that various other persons have had the curiosity to extend it, by widening the avenues and taking down large strata of stone to heighten the roof.

Lemnos, now called *Stalimene*, is situated in the northern part of the Archipelago, formerly called the *Ægean Sea*. The labyrinth constructed on this island is said to have surpassed the others in splendour and magnificence. It was supported by forty columns of uncommon height and thickness, and equally admirable for their beauty and grandeur.

The labyrinth at Clusium in Tuscany was erected by Porsenna, the king of that place, about B.C. 530. It was probably intended to be his own sepulchre. It was a square building of stone, fifty feet in height, and thirty on each side. At each corner stood a pyramid, and also one in the centre, each one hundred and fifty feet high, and at the base seventy-five feet wide. We have no further particulars to offer our readers respecting the Lemnian and Clusian labyrinths.

BLAME not the fates, nor call their lot unkind,
Whose wants are many, and whose joys confined;
For Heaven's best gifts are equal showered around,
As vernal dews that bathe the thirsty ground.
On the unjust and just the rain doth fall,
The sun's bright glories shine alike on all;
The ambient air alike its current blows
On rich and poor, on brothers and on foes;
And love—the last best gift of bounteous Heaven—
Alike to all the tribes of Earth is given.

The late LADY NORTHAMPTON.

Good manners consist in a constant maintenance of self-respect, accompanied by attention and deference to others; in correct language, gentle tones of voice, ease, and quietness in movements and action. They repress no gaiety or animation which keeps free of offence; they divest seriousness of an air of severity or pride. In conversation, good manners restrain the vehemence of personal or party feelings, and promote that versatility which enables people to converse readily with strangers, and take a passing interest in any subject that may be addressed to them.—*Woman's Rights and Duties*.

He who best understands himself is least likely to be deceived by others: you judge of others by yourselves, and therefore measure them by an erroneous standard, whenever your autometry is false.—SOUTHEY.

By reading we enjoy the dead, by conversation the living, and by contemplation ourselves.

SOLITUDE sometimes is best society.

FULLER says, that if God has no need of human learning, still less has He of human ignorance.

THE firm endurance of suffering by the martyrs of conscience, if it be rightly contemplated, is the most consolatory spectacle in the clouded life of man; far more ennobling and sublime than the outward victories of virtue, which must be partly won by weapons not her own, and are often the lot of her foulest foes. Magnanimity in enduring pain for the sake of conscience, is not indeed an unerring mark of rectitude, but it is of all destinies that which most exalts the sect or party whom it visits, and bestows on their story an undying command over the hearts of their fellow-men.—SIR JAMES MACKINTOSH.

BEET-ROOT SUGAR

III. THE INTRODUCTION OF THE MANUFACTURE INTO FRANCE.

IN the second paper on this subject we gave an outline of the methods in which Achard and Gottling produced sugar from beet-root, towards the latter end of the last century. We now proceed to consider the course taken by the French government in relation to this matter.

We alluded in the first article to the desire of Bonaparte that France should be quite independent of England in obtaining a supply of the necessities of life. But there was another motive which turned the direction of the French people to this subject, viz., the enormously high price which cane-sugar had attained, and which was at one time six francs the kilogramme (about two shillings and three pence per pound). Attention was, in the first place, directed to the cultivation of the sugar-cane itself in Provence, but this utterly failed. Then fruits and stems of various kinds were tried, to ascertain whether sugar could be obtained therefrom, but these attempts likewise failed. M. Deyeux was then ordered to prepare a report to the Institute of the experiments made by the Prussian chemist, Achard, detailed in our last paper; and the report given in by Deyeux was very favourable to the cultivation of the beet for the sake of producing sugar. The experiments of Achard, however, being received with some degree of distrust, he immediately offered to repeat them before persons worthy of confidence, and to publish the results in a memoir. The opinion of scientific men became then more favourable to the project, and he established one or two manufactories for beet sugar. These attempts, probably from the inefficient scale in which new projects are almost necessarily conducted, failed in producing any striking results. The plan fell into disrepute for a time, and a new project was entered on, viz., that of producing sugar from raisins. The government sought to encourage this experiment, by offering rewards to those who should be most successful in them. By a decree of the 18th of June, 1810, a sum of one hundred thousand francs, and the cross of the Legion of Honour, were given to M. Proust, and another sum of forty thousand francs was awarded to M. Fouquet, for their exertions in this matter. But the success of these attempts was not such as to lead to permanent results, and they were abandoned.

The motives which had led to the institution of these experiments still continuing, Bonaparte resolved to resume, on a larger scale, the experiment with the beet-root. On the 15th of January, 1812, a decree appeared establishing five chemical schools, for the fabrication of sugar from beet-root; situated respectively at Paris, Wachenheim, Douai, Strasburg, and Castelnauary. A hundred pupils were attached to these schools, each of whom, after three months' study, and a strict examination, was to receive a thousand francs. The Minister of the Interior was empowered to plant one hundred thousand *arpents* (nearly equivalent to English acres) of land in France with beet-root; and four years' exemption from taxes were promised to cultivators. Five large manufactories were to be established, for the preparation of sugar from the root; and their mode of arrangement was such that the production of about five million pounds of sugar per annum was calculated on. What the success of these measures might have been, we do not know, for the disastrous Russian campaign, which soon followed, had the effect of opening the ports of France to sugar produced by foreign countries. At that early stage, the beet-sugar production could not stand without government protection; and this protection being withdrawn, the whole machinery fell to the ground, and for ten years very little was done in the matter.

At length, in the year 1822, several manufactories

were established, but for the most part under unfavourable circumstances; for the speculators seldom united the knowledge and experience of the manufacturer with that of the agriculturist. The want of this union of talent operated so disastrously, that one half of the manufactories were abandoned by the year 1829. This latter year, however, formed a point of time from which this great experiment—for such it undoubtedly is—assumed a more favourable appearance. The slow mode of crystallization until then adopted, was abandoned for one more expeditious; and many improvements were from time to time brought to bear, either upon the cultivation of the root itself, or upon the preparation of sugar from the juice thence extracted. Notwithstanding a tax which was laid upon beet-root sugar, the spread of the manufacture was so rapid, that by the year 1838 there were five hundred and fifty establishments in France, which produced sixty million kilogrammes (about a hundred and thirty million pounds, of beet-root sugar.

In considering the relative advantages likely to result from the use of beet and from cane-sugar, Chaptal, after an experience of twelve years, came to these two conclusions:—that the juice extracted from the beet does not differ from that yielded by the sugar-cane, either in colour, taste, specific gravity, or crystallization; and that the cultivation of beet for the sake of obtaining sugar, may advantageously proceed concurrently with that of the sugar-cane, when the price of cane-sugar is as high as one franc twenty centimes the demi-kilogramme, that is, that when the price of cane-sugar obtained from the French colonies is as high as thirteen-pence per pound, the beet-sugar may be prepared with a profit. These facts being stated and admitted, Chaptal proceeds to consider how far the culture of the beet may be favourable to France generally. He states that the culture of the beet does not prevent the growth of a single ear of corn, because the beet forms an intermediate crop, immediately after the gathering of which, corn may be sown. Moreover, the crop of corn grown in a soil previously planted with beet is said by him to be better than in any other soil; because the soil has been loosened by the beet-roots, and cleared by the weeding which the beet crop has undergone. A farther advantage is, that the preparation of the beet takes place principally in winter, and furnishes work to horses and farm-servants, who are often unemployed at that season. The food for cattle is also provided by the same means as the beet is produced; for the part of the plant which grows above ground, and which is not used in the sugar-preparation, constitutes one of the most valuable kinds of fodder. There is one remark by Chaptal which is of much importance in relation to the manner in which the manufacture should be carried on. He says:—"To insure success for beet-root sugar establishments, it is necessary that they be united to rural cultivation. These kind of manufactures are misplaced in towns. The roots are more expensive when purchased from others, than when the manufacturer grows them himself; the remaining parts of the plant find scarcely any market in a town; hand-labour and fuel are dearer; and farm-servants are less easily procured." Acting on these principles, Chaptal himself, as we shall show in our concluding article, combined in his own person the agriculturist and the manufacturer.

From numerous experiments made upon the beet-root of Bondues, a village situated near Lille, Pelouze found that a soil in which tobacco had been grown the preceding year yielded roots of a considerable size, and of a saccharine richness, equal to that of roots of a smaller size, and superior to similar roots planted in a soil not previously occupied with a tobacco crop. In two neighbouring fields, one of which had had a tobacco crop the preceding year, and the other had not, the produce of sugar from the former was fifty per cent. more than from the latter

It thus appears, that the French chemists and agriculturists have succeeded in bringing the cultivation of the beet to a point of considerable importance. Indeed, at the present time, the quantity of beet-root sugar made in France very nearly equals that of the cane-sugar imported from her colonies. The relation which now exists, or ought to exist, between the two kinds of sugar, with respect to taxation, encouragement, &c., although occupying the attention of persons in that country, would have no interest for the English reader, since beet-root sugar is not cultivated in the British dominions.

We have one more paper to present on this subject, in order to work out the plan proposed. We gave, in the second article, a detail of the processes adopted forty or fifty years ago, in Germany; but we wish to give an idea of the methods actually adopted in France. Chaptal was a chemist, an agriculturist, and a manufacturer, and has given a full account of the modes which he adopted for cultivating the plants, gathering the roots, expressing the saccharine juice therefrom, and obtained crystalline sugar from the juice. A brief account of his process will occupy our concluding paper.

To preserve health is a moral and religious duty: for health is the basis of all social virtues; we can be useful no longer than while we are well.—DR. JOHNSON.

MEDICINE is God's second cause of health.

In exalting the faculties of the soul, we annihilate, in a great degree, the delusion of the senses.—AIME MARTIN.

KING Louis the Twelfth of France was naturally inclined to economy: this was once made a topic of ridicule in his presence, to which he replied, "I had rather see my courtiers laugh at my avarice, than my people weep at my extravagance."

EVERYTHING is either lost or won in the heart; it is there that all battles take place: all moral contests are carried on independently of external objects, and previous to the visible scuffles of divided interests.

"O my son," says an Arabic proverb, "take care that your mouth breaks not your neck."

DEATH is at all times solemn, but never so much so as at sea. A man dies on shore: his body remains with his friends, and "the mourners go about the streets;" but when a man falls overboard at sea and is lost, there is suddenness in the event, and a difficulty in realizing it, which gives to it an air of awful mystery. A man dies on shore, you follow his body to the grave; a stone marks the spot. You are often prepared for the event. There is always something which helps you to realize it when it happens, and to recall it when it has passed. A man is shot down by your side in battle, and the mangled body remains an *object*, and a *real evidence*; but at sea, the man is near you, at your side you hear his voice, and in an instant he is gone, and nothing but a *vacancy* shows his loss. Then, too, at sea—to use a homely but expressive phrase—you *miss* a man so much. A dozen men are shut up together in a bark, upon the wide, wide sea, and for months and months see no forms and hear no voices but their own, and one is taken suddenly from among them, and they miss him at every turn. It is like losing a limb. There are no new faces or new scenes to fill up the gap. There is always an empty berth in the fore-castle, and one man wanting when the small night watch is mustered. There is one less to take the wheel, and one less to lay out with you upon the yard. You miss his form, and the sound of his voice, for habit has made them almost necessary to you, and each of your senses feels the loss.—*Two Years before the Mast.*

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